




FEATURES TO ENGAGE STUDENTS

At the Center for Mathematics and Teaching, we know that all students have the potential to achieve in mathematics, believe that the development of mathematics should reflect the connectedness of Big Ideas into a coherent whole, and make mathematics inviting and inclusive to more students. Many features in *MathLinks* programs engage students in problems and routines that will help them experience success as they see the beauty and utility of mathematics and see themselves as “do-ers” of mathematics.

LOCATIONS OF THE FEATURES REFERENCED IN THIS SECTION

Print	Portal
Teacher Edition <ul style="list-style-type: none"> Unit Planning Information (TE-UPI) Annotated Answer Key, including Student Packet and Lesson Notes (TE-AK)  Program Information (PI) 	Portal Landing Page (LP)  Grade 7 Unit Resources → <Unit number> (UR) <ul style="list-style-type: none"> Teacher Edition Student Packet Other Resources for Students (OR-S) <ul style="list-style-type: none"> ✓ Essential Skills (ES) ✓ Math Talks (MT) ✓ Nonroutine Problems (NP) ✓ Tasks (T) ✓ Projects (P) ✓ Technology Activities (TA) Grade 7 General Resources (GR)

HANDS-ON ACTIVITIES

Building conceptual understanding is at the heart of every *MathLinks* Core course, and many lessons employ hands-on methods to engage students in attaining this goal. Here are some examples for Grade 7. (TE-AK)

- Unit 1, **Probability**: Coins, number cubes, and spinners lead to data collection, data displays, and the development of important probability concepts.
- Unit 2, **Percent and Scale**: Students use triangle cut-outs and protractors in determining figures that are scale drawings of one another.
- Unit 3, **Proportional Relationships**: Students review important unit vocabulary and concepts with card matching activities.
- Units 4 and 5, **Rational Number Addition and Subtraction**; **Rational Number Multiplication and Division**: Manipulating positive and negative integer counters* leads to the collection of empirical evidence to form the rules for operating on integers.
- Units 6 and 7, **Expressions; Equations and Inequalities**: Combining the integer counters with cups* (the unknowns) sets the stage for manipulating expressions and solving equations.
- Unit 8, **Plane and Solid Figures**: Several geometric investigations require the use of various tools throughout the unit, including paper polygons for angle relationships; protractors, straightedges, and technology to draw figures; “sticks” of various lengths for polygon properties; and physical models or technology to explore cross-sections.
- Unit 9, **Length, Area, and Volume**: Students use circular objects and measuring tools to discover pi and the circle circumference formula. Wedges cut from a paper circle lead to the circle area formula.
- Unit 10, **Sampling**: Students estimate a population doing a hands-on “fishing” simulation.

*included with the program

ACTIVITY ROUTINES

Activity Routines are recurring features in *MathLinks*, designed to engage students in problem-solving and practice. Activity Routines are accessible to a wide range of learners and learning styles. Planning for Different Users (TE-UPI) identifies Activity Routines that are especially appropriate for English learners, struggling learners, and enrichment.

This chart shows the location of the routines throughout the course. Detailed instructions for each Activity Routine, along with introductory sample activities, can be found in General Resources on the Teacher Portal. We recommend that teachers use these samples to establish classroom norms and procedures prior to using these activities in the units.

GRADE 7: ACTIVITY ROUTINES

Unit / Domain →	1 SP	2 RP G	3 RP	4 NS	5 NS	6 EE	7 EE	8 G	9 G	10 SP
Big Square (or Triangle) Puzzles	TE-AK ES	ES		TE-AK		NP	TE-AK NP			
Four in a Row	ES	ES	ES	ES NP	ES	ES NP	ES NP	ES	ES	ES
Match and Compare Sorts	TE-AK		TE-AK					TE-AK	TE-AK	TE-AK
Math Talks	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT
Open Middle Problems	ES	ES	ES	ES NP	TE-AK ES	ES	TE-AK ES	ES	NP	ES
Poster Problems	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK
Why Doesn't It Belong?	TE-AK	TE-AK				TE-AK	TE-AK	TE-AK		
The <i>MathLinks</i> Rubric	TE-AK T	TE-AK T	TE-AK T	TE-AK T	TE-AK T	TE-AK T	TE-AK T	TE-AK T	TE-AK T	TE-AK T
Math Path Fluency Challenges	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK

Unit Planning Information (TE-UPI),
Annotated Answer Key, including Student Packets and Lesson Notes (TE-AK),
Essential Skills (ES), Math Talks (MT), Nonroutine Problems (NP), Tasks (T)

TECHNOLOGY ACTIVITIES

While not technology-driven, *MathLinks* promotes the use of technology for the exploration of concepts. Some technology experiences are built into lessons (TE-UI,TE-AK), and a Technology Activities component (TA) appears in Unit Resources on the Portal. TA suggestions include a link, and many come with a *MathLinks* worksheet as a companion to facilitate deeper thinking and connect it to a *MathLinks* lesson.

All *MathLinks* TAs are open source and available to all at the time of the 2025 printing of the program. We invite users to contact us with updates to the availability or other open-source activities they find useful.

GRADE 7: TECHNOLOGY ACTIVITIES

Unit Domain	Title	Technology Required
1 SP	Chance Experiments Experimental Probability Spinner ¹ Virtual Probability Tools Various Problems	Desmos GeoGebra GeoGebra Open Middle Website
2 RP	Various Problems Dueling Discounts ¹	Open Middle Website Spreadsheet / Calculator
G	Scaling Machines ¹ Marcellus the Giant ¹ Similar Shapes	Desmos Desmos Open Middle Website
3 RP	Visual Patterns Constant of Proportionality ¹ Turtle Time Trials ¹ The Running Game ¹	Public domain website Desmos Desmos Desmos
4 NS	Adding Integers ¹ Adding Integers Splat!!! Various Problems	Desmos Desmos Open Middle Website
5 NS	Multiplying Integers Investigation ¹ Multiplying Integers ¹ Order of Operations Exploration ¹ Various Problems	Desmo ¹ Desmos Desmos Calculator Open Middle Website
6 EE	Trousers for Sale The Pool Border Problem ¹ Central Park ¹ Picture Perfect ¹ Expressions and Equations	Calculator Desmos Desmos Desmos Open Middle Website
7 EE	Pentomino Puzzles ¹ Shira the Sheep Expressions and Equations	Desmos Desmos Open Middle Website
8 G	Polygraph: figure It Out Various Problems (angles and triangles)	Desmos Open Middle Website
9 G	Measuring Circles Explore the Area of a Circle ¹ Area of Circles Various Problems (circles, area, and volume)	Desmos GeoGebra Desmos Open Middle Website
10 SP	Body Positivity PSA ¹ What's My Number? Make It Balance Strength In Numbers Mean Absolute Deviation Calculator Five Number Summary Calculator	YouTube Desmos Desmos Desmos Open Source Website Open Source Website

¹Followup worksheet included

PUZZLES, GAMES, AND CARD SORTS

Puzzles, games, and card sorts add variety and encourage student interaction as students develop skills and practice concepts. These activities frequently require copying a Reproducible (TE-UPI or UR)

GRADE 7: PUZZLES, GAMES, AND CARD SORTS

Unit Domain	Puzzles	Games	Card Sorts
1 SP	Spinner Puzzles (TE-AK, ES, NR) Big Square Puzzle (TE-AK) Fluency: Math Path (TE-AK)	Race to the Top (TE-AK) Flip and Roll (TE-AK) The Terminator (TE-AK) Four in a Row (ES)	Will it Happen? (TE-AK) Match & Compare Sort (TE-AK) Spinner Puzzles (NR)
2 RP	Fluency: Math Path (TE-AK)	Four in a Row (ES) Tic-Tac-Toe (ES)	Percent Increase and Decrease (TE-AK) Match 'em Up (ES) Percent Applications (NP)
G			Matching Scale Drawings of Triangles and Squares (TE-AK)
3 RP	Fluency: Math Path (TE-AK)	Four in a Row (ES)	Matching Activity: Nuts (TE-AK) Match & Compare Sort (TE-AK)
4 NS	Practice 3 (TE-AK) Practice 4 (TE-AK) Big Square Puzzles (TE-AK) Fluency: Math Path (TE-AK)	Integer Battle (TE-AK) Integer Showdown (ES) Four in a Row (ES) Summing Squares (NP) Four in a Row (NP)	
5 NS	Practice 5 (TE-AK) Fluency: Math Path (TE-AK) Order of Operations Puzzles (ES)	Four in a Row (ES)	
6 EE	Fluency: Math Path (TE-AK)	Expression Game (TE-AK) Four in a Row (ES) Battling Ships (ES) Big Triangle Puzzle (NP) Four in a Row (NP) Simplifying Expressions Challenge (NP)	Expression Card Sort (TE-AK)
7 EE	Hundred Chart Puzzle (TE-AK) Big Square Puzzle (TE-AK) Fluency: Math Path (TE-AK) Big Square Puzzle (NP)	Four in a Row (ES) Four in a Row (NP) 2-Step Equations Challenge (NP)	
8 G	Fluency: Math Path (TE-AK) Who Am I? (ES)	Four in a Row (ES)	Match & Compare Sort (TE-AK)
9 G	Fluency: Math Path (TE-AK)	Four in a Row (ES)	Match 'Em Up (TE-AK) Area Challenge (TE-AK) Match & Compare Sort (TE-AK)
10 SP	Fluency: Math Path (TE-AK)	Four in a Row (ES)	Match & Compare Sort (TE-AK)

Unit Planning Information (TE-UPI),
Annotated Answer Key, including Student Packets and Lesson Notes (TE-AK),
Unit Resources (UR), Essential Skills (ES), Nonroutine Problems (NP)

REAL-LIFE PROBLEMS AND MATHEMATICAL INVESTIGATIONS

Real-life problems and mathematical investigations provide natural opportunities to work on the Common Core Standards for Mathematical Practice in the context of grade-level mathematics. These problems sometimes create a “need to know,” and sometimes provide opportunities to apply math concepts to meaningful and interesting work. Rubric-worthy problems in Student Packets are good formative assessment options, and Tasks in Other Resources are good summative assessment options.

GRADE 7: REAL-LIFE AND MATHEMATICAL PROBLEMS

Unit Domain	Print (TE-AK) Opening Problems, Lessons, Practice	Portal (UR → OR-S)
1 SP	Race to the Top ¹ A Coin Flip Experiment A Spinner Experiment ¹ Flip and Roll The Terminator ¹ The Cereal Box Simulation	Fair or Unfair? (T) Strange Spinners (T) Design a Game (P) Intransitive Spinners Game (P)
2 RP	Using Coupons ¹	Savings (T)
G	The Birdhouse ¹ A Floor Plan Sports Playing Surfaces	Build a Little Free Library (P)
3 RP	Length and Area Patterns Twinkie the Dog ¹ Practice 2 (Amusement Park) Cap'n Sherman's Shrimp Shop ¹ Practice 3 (Fruity Fizzy Water) Yazzi's Cornbread, Practice 6	T-Shirts(T) Bubble Teas (P)
4 NS	Mortimer's Magic Cubes ¹ A Zero-Sum Game	Fixing the Pipe (T)
5 NS	More of Mr. Mortimer's Magic ¹ Practice 2 (Silvia's counters)	Integer Card Game (T) Create an Integers Operation Game (P)
6 EE	Crossing the Lake ¹ How Many on the Border ¹ What Comes Next? ¹ Trousers for Sale	Rectangle Reasoning (T)
7 EE	Sloan's Phones	Hanging Pictures (T) Reasoning About Solutions (T) Create your own Four in a Row (Equations) Game! (P)
8 G	Tear it Up Polygon Investigations	Paperfolding Polygons (T) A Pattern Block Protractor (P) Fruity Cross-Sections (P) Exploring the Wonders of the World (P)
9 G	Felix the Sheep ¹ Penny Drop Probabilities Dart Board Probabilities Practice 6 (Birdhouse Revisited ¹)	The American Flag (T) The Flag of Finland (NR) A Cube Pattern (NR)
10 SP	Screen Time ¹ Math Score Samples ¹ Estimating Fish Populations Practice 4 (Fish Lengths)	Investigating Box Plots (T) A Fishing Competition (P) School Lunch Survey (ES) Interpreting Data (NP) Fishy Lengths (NP) 400 Meter Freestyle Times* (NP)

Annotated Answer Key, including Student Packets and Lesson Notes (TE-AK), Essential Skills (ES), Nonroutine Problems (NP), Tasks (T), Projects (P)

¹Extensions or follow-ups are included.

DEALING WITH DATA

MathLinks includes a variety of experiences that are intended to help students become critical consumers of data. This knowledge is essential for many future careers and important for everyone in the digital age and a thriving democracy. In many instances, this work involves data about themselves, which generally increases engagement. Data experiences are located in data-driven lessons and problems, Math Talks that focus on data, Projects, Tasks, and EGAD Puzzles (Explore, Generate, and Analyze Data) in Puzzles and Games.

GRADE 7: DATA EXPERIENCES

Unit Domain	Print (TE-AK) Opening Problems, Lessons, Practice	Portal (LP, UR → OR-S)
1 SP	Race to the Top A Coin Flip Experiment A Spinner Experiment Flip and Roll The Terminator The Cereal Box Simulation	Design a Game (P) “Intransitive” Spinners Game (P) Data Talks A: Teen behaviors (MT) Data Talks B: Teen behaviors (MT) Data Talks C: Interpreting a bar graph (MT) Explore, Generate, and Analyze Data (LP)
2 RP		Data Talks A: Teen behaviors (MT) Data Talks B: Teen behaviors (MT)
3 RP	Twinkie the Dog	Data Talks A: Cost of a food item – slow reveal (MT) Data Talks B: Teen behaviors (MT)
4 NS		Data Talks A: Population – slow reveal (MT) Data Talks B: Teen behaviors (MT)
5 NS	Trousers for Sale	Data Talks A: Life expectancy – slow reveal (MT) Data Talks B: Teen behaviors (MT)
6 EE		Data Talks A: Water usage – slow reveal (MT) Data Talks B: Teen behaviors (MT)
7 EE		Data Talks A: NBA Salaries – slow reveal (MT) Data Talks B: Teen behaviors (MT)
8 G	Spiral Review Question 6	Data Talks A: Cereal Consumption Data Talks B: Teen behaviors (MT)
9 G	A Length Investigation	Data Talk A: Olympic medals (MT)
10 SP	Screen Time Revisiting Probability Getting Started Math Score Samples Practice 2 Practice 3 Estimating Fish Populations Practice 4 Poster Problems Would you Rather	Investigating Box Plots (T) A Fishing Competition (P) Data Talks A: Height vs shoe size (MT) Data Talks B: Incomplete table – occupations (MT) Data Talks C: Incomplete chart – countries (MT) Data Talks D: Incomplete circle graph - sports (MT) Data Talks E: Incomplete bar graph – power sources (MT) Explore, Generate, and Analyze Data (LP)

Annotated Answer Key, including Student Packets and Lesson Notes (TE-AK),
Portal Landing Page (LP), Math Talks (MT), Tasks (T), Projects (P)

MATHEMATICS AND THE ENVIRONMENT

Environmental education is important because it provides the knowledge and understanding necessary to address global issues such as climate change, pollution, and habitat destruction. Many students today are concerned about these issues and may be motivated by problems associated with the environment. *MathLinks* includes a variety of references or problems that call attention to environmental challenges in the context of grade-level mathematics. We invite teachers to launch discussions based on these problems as time permits. See more about connections to the environment in General Resources on the Teacher Portal.

GRADE 7: CONNECTIONS TO ENVIRONMENTAL ISSUES

Unit Domain	Print Opening Problems, Lessons, Practice	Portal (UR → OR-S)
1 SP	Weather probabilities (TE-AK)	
2 RP	Electric, hybrid, and gas vehicles (TE-AK)	
G	Little Free Library (TE-AK)	Build a Little Free Library (P)
3 RP	Ratios are Everywhere (TE-UPI) Electric vehicles vs. hybrid cars (TE-AK) Community Garden (TE-AK)	
6		Data Talk A (MT) – Water Used to Make Various Food Items (in gallons)
8 G	Pyramids – an ancient wonder of the world (TE-AK)	Preserving the Wonders of the World (P)
9 G	Spiral Review, Questions 6, 7 (TE-AK)	
10 SP	Using Data to Understand Our World (TE-UPI) Estimating Fish Populations (TE-AK)	

Unit Planning Information (TE-UPI),
Annotated Answer Key, including Student Packets and Lesson Notes (TE-AK),
Projects (P)

STUDENT IDENTITY AND CULTURE

At the Center for Mathematics and Teaching, we believe that all students have the ability and deserve the opportunity to learn the mathematics that will make them capable and confident problem solvers and put them on the pathway to college and career readiness. To accomplish this, we believe that students must see themselves as “do-ers of mathematics”. In addition to engaging students with features previously cited in this section, *MathLinks* empowers student effort and success through:

- An inclusive classroom of students pictured on the front of each Student Packet. These students “join” the class on slide decks with problem-solving ideas and opportunities to critique the reasoning of others.
- Self-assessment opportunities in every unit (e.g., Monitor Your Progress, unit Reflection pages, the *MathLinks* Rubric)
- References to accomplished role models (e.g., Ellen Ochoa, Latin American Astronaut (Unit 3); John Wooden, UCLA basketball coach (Unit 9); Katherine Johnson, African-American mathematician (Unit 10); Mary G. Ross, Native-American engineer (Unit 10))
- Data talks where students may use personal experiences to analyze data about teens.